

AMENDMENTS TO THE CLAIMS, COMPLETE LISTING OF CLAIMS
IN ASCENDING ORDER WITH STATUS INDICATOR

Please amend the following claims as indicated.

1. (Currently Amended) A liquid dispensing apparatus comprising:
- a dispensing mechanism including a plurality of dispensing device~~device~~s for dripping a sample or a reagent;
 - an image capturing device for capturing the downward area image;
 - a movable table capable of supporting, on its upper surface, a target object onto which the sample or reagent is to be dispensed and being moved on a horizontal plane surface for positioning the target object at least at a dispensing position beneath the dispensing device and at an image capturing position beneath the image capturing device;
 - a monitoring section for displaying the image captured by the image capturing device;
 - a dispensing position designating section for designating the dispensing position on the target object based on the image of the target object displayed on the monitoring section; ~~and~~
 - a dispensing control section for positioning the target object and the dispensing device relative to each other so that the dispensing position on the target object designated by the dispensing position designating section is placed beneath the dispensing device, which performs the dispensing operation, of the dispensing mechanism and for controlling the dispensing operation of the dispensing mechanism;
 - the image capturing device for photographing the tip end of the dispensing device; and
 - a moving mechanism for moving the image capturing device in association with the switching of the dispensing device performing the dispensing operation so that the image capturing device is capable of photographing the tip end of the dispensing device performing the dispensing operation.

2. (Canceled).

3. (Currently Amended) A liquid dispensing apparatus according to ~~claims-claim 1 or 2~~, further comprising a dispensing position information creating section for creating dispensing position information about the dispensing position on the target object which is designated by the dispensing position designating section and for which the dispensing operation has been performed.

4. (Currently Amended) A liquid dispensing apparatus according to ~~claims-claim 1 or 2~~, wherein the dispensing position information creating section is capable of outputting the created dispensing position information to the outside.

5. (Currently Amended) A liquid dispensing apparatus according to ~~claims-claim 1 or 2~~, wherein the dispensing position designating section designates the dispensing position on the image of the target object displayed on the monitoring section.

6. (Canceled).

7. (Canceled).

8. (Currently Amended) A dispensing apparatus comprising:
a dispensing mechanism including a detachable dispensing device for dripping a sample or reagent;
an image capturing device for capturing downward area image;
a movable table capable of supporting, on its upper surface, a target object onto which the sample or reagent is to be dispensed and being moved on a horizontal plane surface for positioning the target object at least at a dispensing position beneath the dispensing device and at an image capturing position beneath the image capturing device; and
a calibrating section which, after liquid is dispensed onto a predetermined position on the movable table by the dispensing mechanism, detects the dispensing position based on the image captured by the image capturing device and calibrates the dispensing position based on base points

serving as references on the movable table, the base points being captured concurrently with the image,

wherein the dispensing device has a discharging port at its lower end, and

wherein the dispensing mechanism further comprising:

a dispensing device retaining portion fixed to a main body of the liquid dispensing apparatus, the retaining portion arranging the dispensing device with the discharging port facing downwardly;

dispensation liquid container arranged on the dispensing device retained by the retaining portion to communicate to the dispensing device;

an air-introducing head arranged on the dispensation liquid container for communicating to the dispensation liquid container to adjust an inner pressure of the dispensation liquid container;
and

an arm mechanism including an arm and a lock, the arm being supported rotatably at its base end on the main body to mount the air-introducing head detachably, the lock being capable of fixing the arm to the main body so that the air-introducing head is mounted on the dispensing device retained by the retaining portion through the dispensation liquid container and capable of releasing the fixing.

9. (Original) A liquid dispensing apparatus according to claim 8, wherein the dispensing mechanism includes a plurality of dispensing devices and the calibrating section performs the calibration for the respective dispensing devices.

10. (Withdrawn) A position information capturing device comprising:

an image capturing device for capturing an image of a target object on a table; and

a position information creating section for creating, based on the image captured by the image capturing device, information about a position designated or detected in the image, based on a plurality of reference points serving as references on the target object.

11. (Withdrawn) A position information capturing device according to claim 10, further comprising:

a monitoring section for displaying the image captured by the image capturing device;
and

a position designating section for designating a position on the target object based on the image of the target object displayed on the monitoring section;

wherein the position information creating section creates information about the position on the target object designated by the position designating section.

12. (Withdrawn) A position information capturing device according to claims 10 or 11, wherein

the image capturing device also captures an image of the table along with the image of the target object; and

the position information creating section creates a position on the target object based on a plurality of base points serving as references on the table.

13. (Withdrawn) A position information capturing device according to claims 10 or 11, wherein the dispensing position information creating section is capable of outputting the created dispensing position information to the outside.

14. (Withdrawn) A sample plate comprising:

a plate-shaped member having a surface onto which a sample or reagent is to be dispensed,

the plate-shaped member being provided with, on the surface, a plurality of marks serving as positional references.

15. (Canceled).

16. (Canceled).

17. (Canceled).

18. (Canceled).

19. (Withdrawn) A monitoring method comprising:
installing an image capturing device obliquely above a nozzle for dripping a sample or a reagent; and
photographing, with the image capturing device, the condition of a liquid drop dripped from the nozzle for monitoring the condition of dispensation.

20. (Withdrawn) A dispensing method using a dispensing unit; the dispensing unit comprising a piezo chip having a downward opening portion at its discharging portion and being configured to discharge liquid drops from the discharging portion when liquid charged in a space communicated to the discharging portion is pushed by a driving section including a piezo device, a pressure control mechanism for adjusting the pressure of the liquid charged in the space, and an image capturing device for capturing an image of the discharging portion, the method comprising the steps of:

capturing and storing an image of the discharging portion before charging liquid in the space by the image capturing device;

after charging liquid in the space, capturing images of the discharging portion by the image capturing device, determining the differences between these images and the image captured before charging liquid and controlling the pressure control mechanism so that, when liquid exits from the discharging portion, the liquid is retracted until the differences between these images and the image captured before charging liquid is cancelled, in a preparation stage before the start of dispensation operation from the piezo chip.

21. (Withdrawn) A dispensing method according to claim 20, wherein the control of the pressure control mechanism is automatically performed based on images captured by the image capturing device.

22. (Original) A dispensing apparatus comprising:

a dispensing unit including a piezo chip having a downward opening portion at its discharging portion, the piezo chip being configured to discharge liquid from the discharging portion when liquid charged in a space communicated to the discharging portion is pushed by a driving section including a piezo device,

a pressure control mechanism for adjusting the pressure of the liquid charged in the space;

an image capturing device for capturing an image of the discharging portion;

a storing device for storing the image captured by the image capturing device; and

a control device which compares the image of the discharging portion captured before charging liquid in the space and stored in the storing device with images captured after charging liquid in the space and controls the pressure control mechanism so that, when liquid exits from the discharging portion, the liquid is retracted until the differences between the images and the image captured before charging liquid is cancelled.

23. (Original) A dispensing apparatus according to claim 22, wherein the image capturing device is installed so that it captures the image of the discharging portion along a horizontal direction.

24. (Withdrawn) A dispensing method utilizing a dispensing unit for discharging liquid drops from a discharging portion at its tip end; the method comprising the steps of:

acquiring an image of a liquid drop discharged from the discharging portion;

determining the size of the liquid drop based on the captured image; and

adjusting parameters of control signals output to a discharging driving section of the dispensing unit, based on the determined size of the liquid drop, so that the amount of dispensed liquid drop becomes equal to a predetermined value.

25. (Withdrawn) A dispensing method according to claim 24, wherein the dispensing unit utilizes a piezo-dispensing system including a piezo head and the piezo head is configured to discharge the liquid drop from the discharging portion when liquid charged in a space communicated to the discharging portion at its tip end is pushed by a driving section including a piezo device.

26. (Withdrawn) A dispensing method according to claim 25, wherein the parameters of control signals include at least one of: the amplitude of the voltage applied to the piezo device, the rising time of the applied voltage, the voltage application time period, and the descending time of the applied voltage.

27. (Withdrawn) A dispensing method according to claim 24, wherein the dispensing unit utilizes a syringe-pump dispensing system.

28. (Withdrawn) A dispensing method according to claim 27, wherein the parameters of control signals include at least one of: the stroke, the speed and the acceleration of the plunger of the syringe pump.

29. (Withdrawn) A dispensing method according to claims 27 or 28, wherein the image for determining the size of the liquid drop are an image of ball-shaped liquid drop at the tip end of the discharging portion.

30. (Previously Presented) A liquid dispensing apparatus according to claim 3, wherein the dispensing position information creating section is capable of outputting the created dispensing position information to the outside.

31. (Previously Presented) A liquid dispensing apparatus according to claim 3, wherein the dispensing position designating section designates the dispensing position on the image of the target object displayed on the monitoring section.

32. (Previously Presented) A liquid dispensing apparatus according to claim 4, wherein the dispensing position designating section designates the dispensing position on the image of the target object displayed on the monitoring section.

33. (Withdrawn) A position information capturing device according to claim 12, wherein the dispensing position information creating section is capable of outputting the created dispensing position information to the outside.

34. (Canceled).